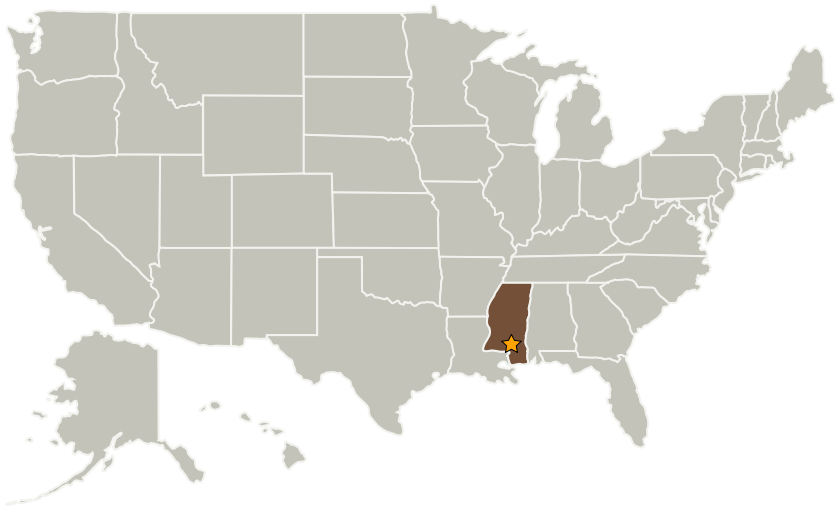
Real time, Non-intrusive Detection of Liquid Nitrogen in Liquid Oxygen (LOX) at High Pressure and High Flow, Phase I

Completed Technology Project (2004 - 2005)

Project Introduction

SSC needs the sensors that are capable and can be operated in liquid oxygen (LOX) and or liquid hydrogen (LH2) cryogenic environment to improve SSC cryogenic testing. In particular, the Stennis Space Center (SSC) would like to develop a sensor to monitor the quality of LOX in the delivery line during the testing of a rocket engine. Spontaneous Raman scattering (SRS) with its relative simplicity and multi-molecule analysis can be easily employed to develop a sensor for on-line, real-time measurement. The goal of the proposed effort is to develop a SRS sensor, which is able to provide sub-millisecond sampling time for detecting nitrogen percent concentration in cryogenic propellants. During Phase I, a SRS system based on photo multiplier tube detection will be designed. The experimental parameters will be evaluated to achieve optimum response time and sensitivity. A prototype will be delivered to NASA/SSC at the end of Phase I. The study from Phase I will provide the necessary information to improve the phase II prototype design to achieve sub millisecond response time and better sensitivity. In Phase II, a prototype SRS system will be developed and tested at SSC and will be delivered to NASA/SSC for on line measurement

Primary U.S. Work Locations and Key Partners



Real time, Non-intrusive Detection of Liquid Nitrogen in Liquid Oxygen (LOX) at High Pressure and High Flow, Phase I

Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Stennis Space Center (SSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Real time, Non-intrusive Detection of Liquid Nitrogen in Liquid Oxygen (LOX) at High Pressure and High Flow, Phase I

Completed Technology Project (2004 - 2005)

Organizations Performing Work	Role	Type	Location
★Stennis Space Center(SSC)	Lead Organization	NASA Center	Stennis Space Center, Mississippi
Mississippi Ethanol, LLC	Supporting Organization	Industry	Winona, Mississippi

Primary U.S. Work Locations
Mississippi

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX01 Propulsion Systems
  - TX01.1 Chemical Space Propulsion
    - TX01.1.3 Cryogenic